REMARKS

Claims 1-4, 6-12, 14-34, and 36-76 have been amended, claims 5 and 13 have been canceled, and new claims 77-82 have been added. Claims 1-4, 6-12, and 14-82 are presented for further examination, with claims 1, 11, 17, 33, 49, 56, 63, 70, and 77-82 being independent.

Any grounds which may have existed for the rejection of claims 1-4, 8, 11, 17, 28-30, 32, 33, 41-46, 48, 53, 55, 60, 62, 67, 69, and 73 under 35 U.S.C. §112, second paragraph, are believed obviated by the foregoing amendments to claims 1-4, 8, 11, 17, 28-30, 32, 33, 41-46, 48, 53, 55, 60, 62, 67, 69, and 73. In particular, claims 1-4, 8, 11, 17, 25, 28-30, 32, 33, 41-46, and 48 have been amended to recite "in terms of flow rate" (see page 26, lines 10-11, of the present specification), and claims 53, 55, 60 ,62, 67, 69, and 73 have been amended to recite "is selected from the group consisting of". Applicants respectfully request withdrawal of the rejection of claims 1-4, 8, 11, 17, 28-30, 32, 33, 41-46, 48, 53, 55, 60, 62, 67, 69, and 73 under 35 U.S.C. §112, second paragraph.

The rejection of: **(1)** claims 1-4, 9-10, 63-65 and 67-69 as allegedly obvious over U.S. Patent Application Publication No. 2003/0129106 ("Sorensen") in view of U.S. Patent Application Publication No. 2002/0020429 ("Selbrede"), **(2)** claims 5-8, 17-30, 33, 49-51, 53-55, 66, 70-72 and 74-76 as allegedly obvious over Sorensen in view of Selbrede and further in view of U.S. Patent No. 5,288,971 ("Knipp"), **(3)** claims 11 and 12 as allegedly obvious over Sorensen in view of Selbrede and in view of U.S. Patent Application Publication No. 2002/0000198 ("Ishikawa"), **(4)** claims 31, 32, and 52 as allegedly obvious over Sorensen in view of Selbrede and in view of Ishikawa and further in view of Knipp, **(5)** claims 13-16 as allegedly obvious over Sorensen in view of Selbrede and in view of Ishikawa and further in view of Knipp, **(6)** claims 33-46 and 56-62 as allegedly obvious over Sorensen in view of Selbrede and in view of U.S. Patent No. 4,662,977 ("Motley") and Knipp, and **(7)** claims 47, 48, and 73 as allegedly obvious over Sorensen in view of Selbrede and in view of Motley and Knipp and further in view of Ishikawa are respectfully traversed.

Sorensen discloses a plasma processing apparatus that induces differential pressure between a deposition chamber 30 and a toroidal vessel (*i.e.*, plasma generator) 18, wherein processing is conducted in the deposition chamber 30 at a relatively low pressure of 0.1 Torr – 2 Torr, while the plasma ignition is achieved at a relatively high pressure of 5 Torr – 20 Torr in the toroidal vessel 18. In order to maintain the differential pressure, there is provided a flow restrictor 150 between the deposition chamber 30 and the toroidal vessel 18. (See Page 4, Paragraph [0044]). Sorensen specifically discloses, "For efficient operation, the internal pressure of the toroidal vessel 18 is held at a pressure suitable for the particular application." (Page 4, Paragraph [0044]). Thus, Sorensen discloses holding the pressure of the toroidal vessel 18 at a "suitable" pressure and carrying out deposition in the deposition chamber 30 at a pressure different from the pressure of the toroidal vessel 18. While Sorensen discloses that "it may be desirable to maintain the pressure as high as feasible" (page 4, paragraph [0044]), this does not mean that the total pressure is ***increased after plasma ignition.***

Selbrede merely discloses ***lowering of plasma power*** by decreasing the gas pressure according to the relationship of Figure 12. By decreasing the gas pressure, Selbrede attains the decrease of plasma power to 3 kW or less as set forth in paragraph [0012] of Selbrede. Selbrede does not disclose or suggest increasing the total pressure after plasma ignition. Such increase of total pressure in Selbrede would result in increase of the power needed for maintaining the plasma, while such increase of plasma power is contradictory to the object of Selbrede. Thus, Selbrede teaches away from increasing the total pressure after plasma ignition.

The Office Action acknowledges that "Sorensen does not expressly disclose increasing the total pressure after ignition." (Page 8). Thus, the Office Action cites Knipp for disclosure that,

> [A]ccording to the Paschen curve, for every gas or gas mixture there is a minimum voltage for plasma ignition, this minimum depends on the pressure (and other parameters).
>
> Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Sorensen to perform plasma ignition at the pressure where the ignition voltage (power) is at minimum. One of ordinary skill in the art would have been motivated to choose minimum voltage plasma ignition in order to obtain a reliable ignition process avoiding higher ignition voltages which can lead to arcing and damaging the high frequency voltage circuit. Then, if the desirable plasma process pressure is at the right hand side (14) of minimum voltage ignition point (13) in figure 5 of Knipp, it would have been obvious to one of ordinary skill in the art at the time the invention [was made] to increase the pressure from (13), after plasma ignition, to arrive at the desired process pressure (14).

(Pages 9-10).

Knipp merely teaches impedance control at the time of plasma ignition. As Sorensen discloses holding the pressure of the toroidal vessel 18 at a "suitable" pressure and carrying out deposition in the deposition chamber 30 at a pressure different from the pressure of the toroidal vessel 18, Applicants respectfully submit that in combining Sorensen (and Selbrede) with Knipp, one of ordinary skill in the art would: (1) choose the pressure that minimizes the voltage of plasma ignition in the toroidal vessel 18 and maintain this pressure in the toroidal vessel 18, and (2) use a different pressure, appropriate for the processing, in the deposition chamber 30.

A judgment on obviousness must take into account only knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made and not include knowledge gleaned only from applicant's disclosure. *In re McLaughlin* 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971); MPEP § 2145. Applicants respectfully submit that in asserting that "it would have been obvious to one of ordinary skill in the art at the time the invention [was made] to increase the pressure from (13), after plasma ignition, the Office Action has improperly included knowledge gleaned only from Applicants' disclosure. For example, the present specification, referring to FIG. 6, explains that there occurs

an increase of etching rate and hence cleaning rate by increasing the total pressure inside the processing vessel 11 (and thus the NF_3 gas partial pressure) when the concentration of the NF_3 gas is fixed. (Page 10, Paragraph [0032]).

Accordingly, Applicants further submit that a *prima facie* case of obviousness has not been established, as the proposed combination of Sorensen, Selbrede, and Knipp does not disclose all of the present claim limitations. In particular, none of the cited references discloses or suggests ***increasing the total pressure*** after plasma ignition.

Applicants additionally respectfully submit that the relationship of Figure 10 of the present application for attaining plasma ignition is derived from the experiments diagramed in Figure 9 with the motivation of attaining a greater cleaning rate of, for example, 500 nm/minutes or more under a total pressure of, for example, 1200 Pa. (See Pages 9-10, Paragraphs [0030]-[0031] and Figures 5-7). Thus, the relationship of Figure 10 is ***not*** derived from the Paschen curve.

Neither Ishikawa, which the Office Action cites for disclosure of F2 (see, for example, page 13), nor Motley, which the Office Action cites for disclosure of NF3/Ar gas mixture (see, for example, pages 18-19), cures the above-noted deficiencies with regard to Sorensen, Selbrede, and Knipp. In particular, neither Ishikawa nor Motley discloses or suggests ***increasing the total pressure*** after plasma ignition.

In view of the foregoing, the application is respectfully submitted to be in condition for allowance, and prompt favorable action thereon is earnestly solicited.

If there are any questions regarding this reply or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and

please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #010986.57272US).

Respectfully submitted,

October 21, 2008

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